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PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improved Apparatus for the Electrical Transmission of Optical Images.

I, Archibald Montgomery Low, Captain in His Majesty's Army, of Royal Flying Corps Experimental Works, Feltham, in the County of Middlesex, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to apparatus for electrically transmitting optical images such as photographs of the kind embodying a plurality of selenium cells or the like, the object of the invention being to provide improved apparatus of this character which while being very sensitive in operation will be capable of transmitting optical images through considerable distances.

The invention consists in apparatus of the type referred to for the electrical transmission of optical images comprising a frame containing a number of rows of selenium cells or the like and a member adapted to move relatively to said cells and having a number of contacting members corresponding to the number of cells in each row of cells.

The invention also consists in the improved apparatus hereinafter described and illustrated.

In the accompanying drawings

Figure 1 is a side elevation of one convenient form of transmitting apparatus in accordance with the invention;

Figure 2 is an end elevation and

Figure 3 is a more or less diagrammatic view showing transmitting and receiving apparatus constructed and arranged in accordance with the invention.

In carrying my invention into effect in the manner illustrated I provide any suitable form of standards *a*, framework or foundation for my improved apparatus, and upon this framework or upon the standards I arrange a metal or other tray or frame *b* divided into compartments by longitudinal and transverse strips *c* of insulating material as shown more clearly in Figure 3. Into each of these compartments or spaces I insert a selenium cell *d*, the cell being retained in position by a closure for the bottom of the compartment formed from a perforated tin or other electrically conducting plate (not shown).

The sides of the tray or frame may be extended for some distance above the cells so that the latter may be covered or surrounded by a partial dielectric such as a mixture of oil and water. Above the tray or frame and at a suitable distance therefrom I arrange a roller comprising conducting discs *e* separated by insulating strips *f*, the discs and strips being of such a width that when the roller is in position they will register with the selenium cells and insulating strips separating the same, and any suitable means are provided for traversing the roller across the face of the frame or tray and when necessary for maintaining its distance from the selenium cells constant.

In the particular construction illustrated the roller is carried upon a shaft *g* mounted in bearings arranged in slots *h* in the upper end of arms or links *i* pivoted to the main frame at *k*, the arms or links being formed with extensions *l* below the pivot provided with rollers or like anti-friction members *m* adapted to engage a cam groove *n*, the arrangement being such that as the cam *o* is rotated at a constant speed the cam groove *n* will cause the arms or levers *i* and therefore the roller to be moved across the face of the frame or tray *b* at a uniform rate.

The air gap between the roller and the cells is maintained constant by the arrangement of the slotted arms or links and by the grooved pulleys *p* engaging rails or projections upon the sides of the frame or tray.

During its traverse across the face of the tray the roller is required also to be rotated so that the cells in the transmitting apparatus may be successively placed into electrical communication with the appropriate or corresponding part of the receiving apparatus, and for this purpose I provide upon the roller spindle a commutator *q* having as many insulated segments as there are conducting discs *e* in the roller, each segment being in electrical communication with a corresponding disc as shown at the left hand side of Figure 3.

The roller is adapted to be rotated by means of a chain *r* passing about a chain wheel *s* adapted to be rotated in any suitable manner by hand or by the application of power, and the cam *o* is rotated from the same source by means of the bevel gearing *t* and worm and worm wheel *u*, *v*, the speed of the rotation of the roller being so proportioned to the rate of movement of the roller across the tray that the roller will perform exactly one revolution during the time taken for it to pass across one row of cells so that each individual cell in such row by means of the commutator *q* connected with the roller will be placed in electrical communication with the corresponding part of the receiving apparatus.

In order to permit of the necessary movement of the arms *i* and to facilitate the distancing of the roller from the cells I arrange the chain *r* to be of increased length as shown in Figure 1 and to be tensioned by means of the weighted lever *w*, the tensioning device being capable of adjustment if necessary by means of the sliding weight *x*.

The image to be transmitted is projected by a suitable optical arrangement such as a lens or a lens and mirror on to the lower surface of the cells *d* and an alternating voltage of high and constant maximum value and of high and constant periodicity is applied to the roller so that as the latter traverses over the cells sparks pass between the conducting discs *e* and such of the selenium cells as are exposed to light, the currents thus transmitted being collected by any suitable means and transmitted to the receiving station.

In Figure 3 there is illustrated diagrammatically a complete apparatus showing the transmitter on the left-hand side and the receiver on the right-hand side, the latter comprising a frame *z* containing a number of copper or like plates 1, insulated from one another and corresponding in number to the number of selenium cells in the transmitting apparatus. These plates are adapted to be traversed by a roller 2, to the spindle 3, of which is secured a commutator 4 similar to that provided in the transmitting apparatus, the two rollers being arranged to rotate in synchronism so that it will be clear that the circuit through any given plate will be completed at the instant that the circuit is completed through the corresponding cell of the sending apparatus.

The plates may be electrically connected to members, 5, comprising strips formed of two metals having substantially different co-efficients of expansion so that they transmit more or less light according to the current passing through them, or any other suitable form of receiving apparatus may be adopted.

In the arrangement shown it will be obvious that one wire is sufficient to connect the sending apparatus with the receiving apparatus, but I do not confine myself to the use of wires for actually transmitting the current as this may be accomplished by electric radiation.

Similarly the invention is not to be confined to the details described for permitting the relative movement of the roller and selenium cells, and for maintaining the air gap between them constant, as in place of traversing the roller the cells may, if desired, be caused to traverse or the roller may be so mounted and driven that in its traversing movement it will move through an arc of a circle determined by the length of the pivoted arm carrying the roller, and in this case suitable means may be provided for rocking the frame in order to maintain the air gap substantially constant, such an arrangement having the advantage of maintaining the partial dielectric in constant agitation. Where, as is shown in the drawing, the frame or tray remains stationary the agitation of the dielectric, if necessary, may be effected by an agitating member or members carried by the roller supporting arm or other movable part of the apparatus.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Apparatus for the electrical transmission of optical images comprising a frame or tray containing a number of rows of selenium cells and a member adapted to move relatively to said cells and having a number of conducting

members corresponding to the number of cells in a row, substantially as described.

2. Apparatus for the electrical transmission of optical images as claimed in Claim 1 provided with means for maintaining substantially constant the air gap between the cells and the conducting members upon said movable member.

3. Apparatus for the electrical transmission of optical images as claimed in Claim 2 in which the movable member comprises a roller formed with a number of insulated conducting discs and adapted to be traversed across the face of the cells and to place the same successively in electrical communication with the corresponding part of the receiving apparatus, substantially as described.

4. Apparatus for the electrical transmission and reception of optical images comprising transmitting apparatus in accordance with the preceding claims and receiving apparatus similarly formed but having conducting plates to replace the selenium cells, said plates being in electrical connection with metal strips adapted to pass more or less light according to the current passing through them, substantially as described.

5. Apparatus for the electrical transmission of optical images, substantially as hereinbefore described and as illustrated by the accompanying drawings.

Dated this 14th day of September, 1917.

MARKS & CLERK.

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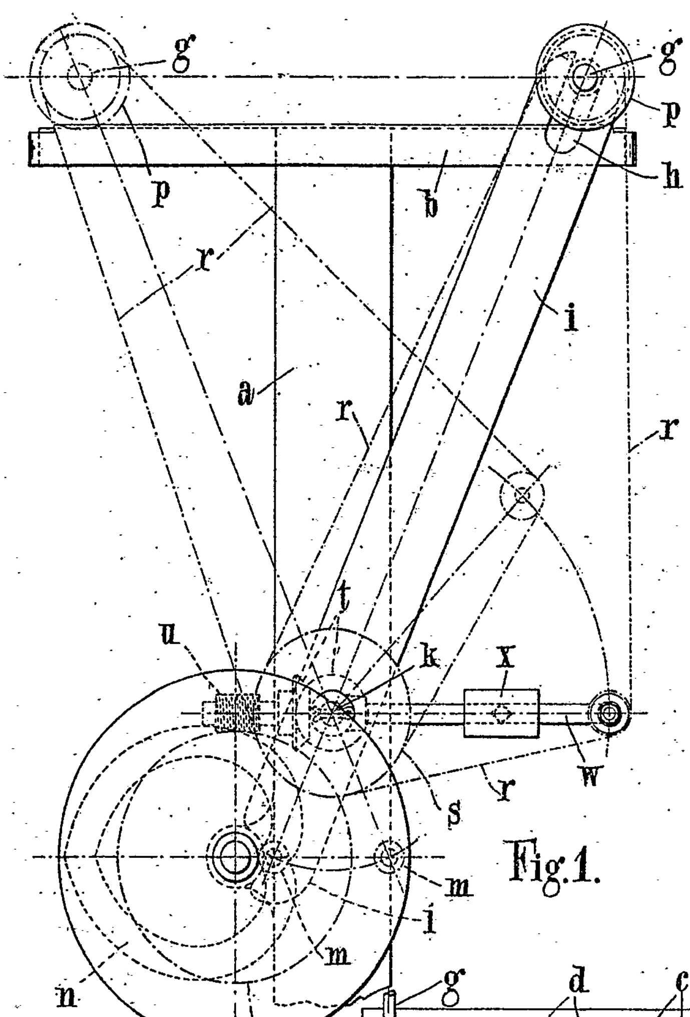
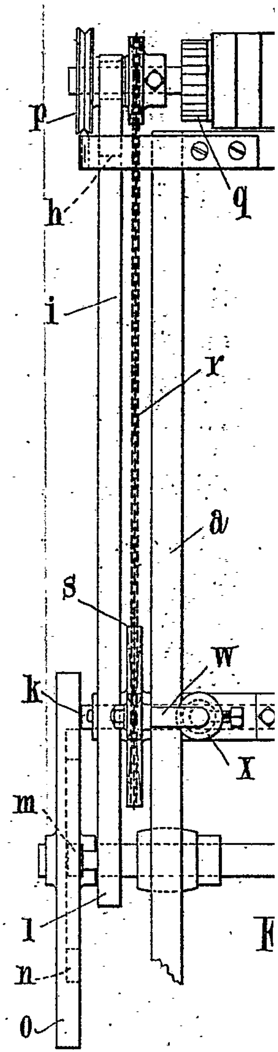


Fig.1.



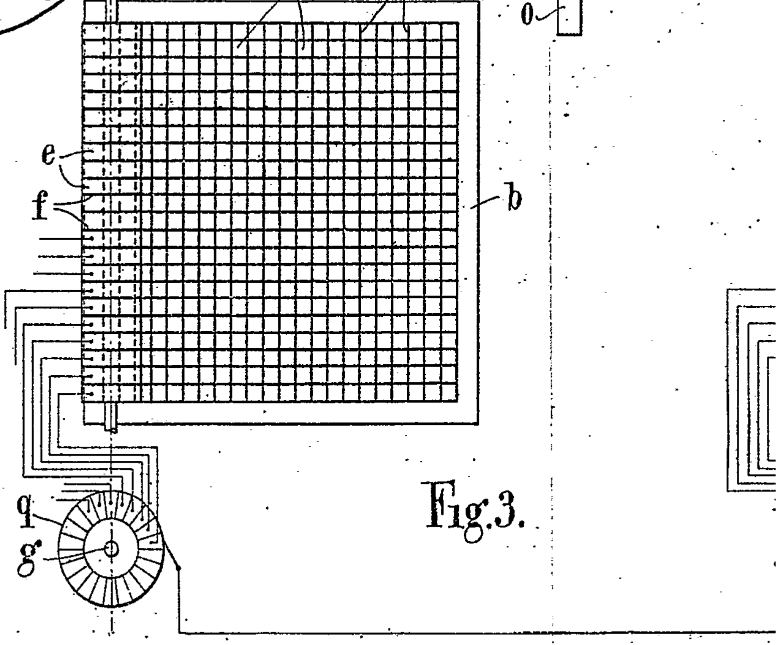


Fig.3.

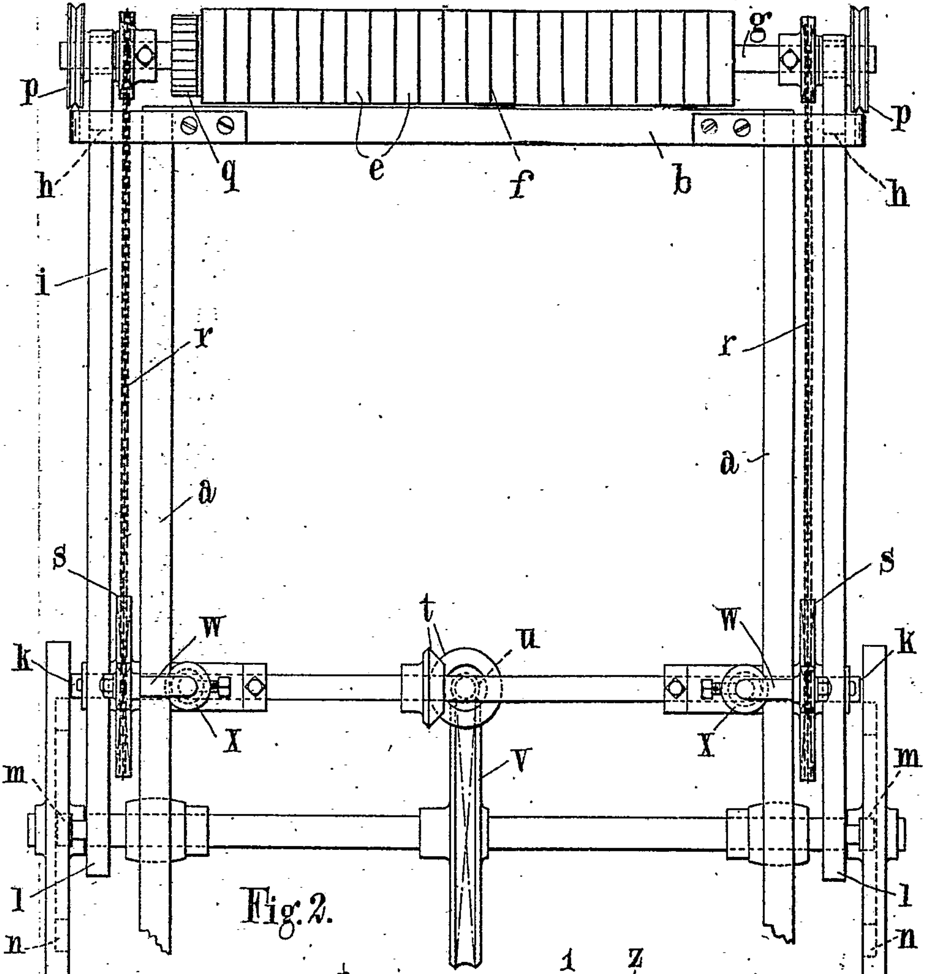


Fig. 2.

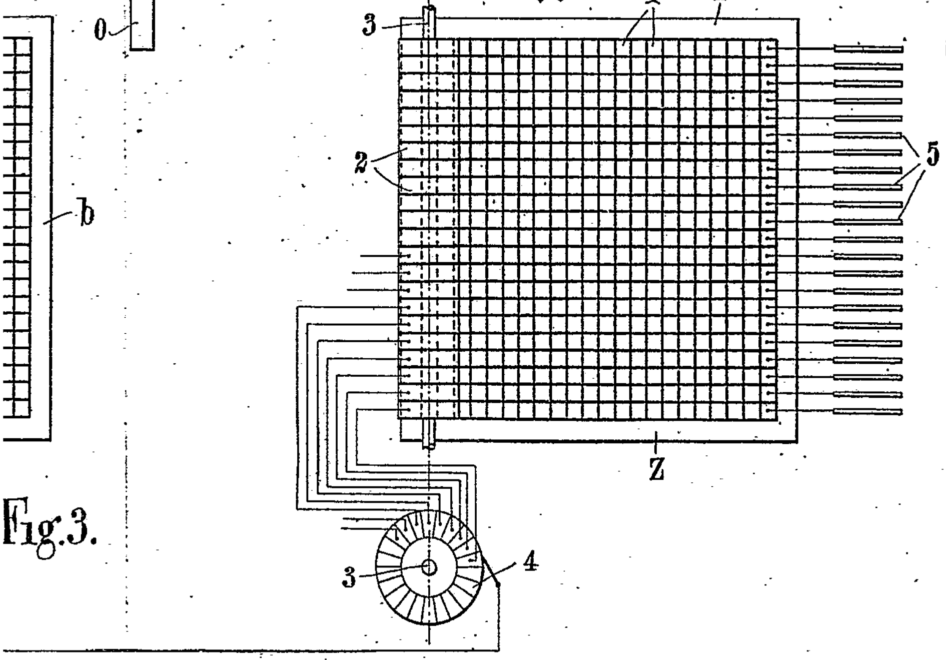


Fig. 3.

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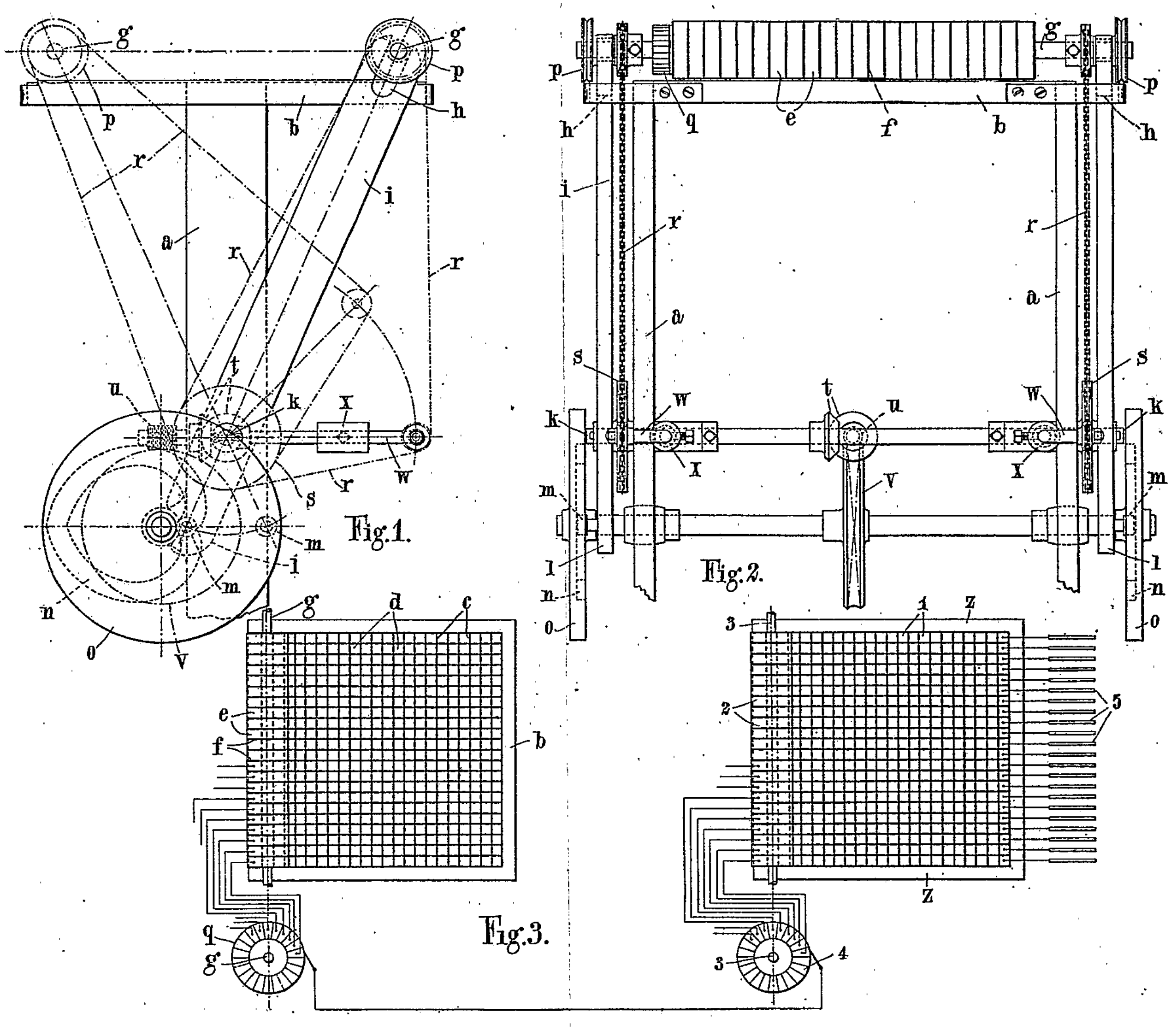

Fig.1.

Fig.2.

Fig.3.

[This Drawing is a reproduction of the Original on a reduced scale]